Consumer and Corporate Affairs Canada | Consommation et Corporations Canada

(11) (A) No. 1 158 335

(45) ISSUED 831206

(52) CLASS 340-125

(51) INT. CL.[3] B60R 25/00

(19) (CA) **CANADIAN PATENT** (12)

(54) STOP-A-THIEF

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(21) APPLICATION No. 383,771

(22) FILED 810623

No. OF CLAIMS 2

Canada

DISTRIBUTED BY THE PATENT OFFICE, OTTAWA.
CCA-274 (11-82)

ABSTRACT

Stop-a-Thief is a "passive" theft prevention system for vehicles. It automatically protects the vehicle from being driven away and does not rely on the driver for activation. The owner of the vehicle must by-pass this protection each time he starts his vehicle by pressing down,or closing,a momentary switch. However,when the ignition switch is turned off,Stop-a-Thief is automatically reactivated. This theft prevention is achieved on all 12-volts ignition systems by intercepting the wire that connects the two terminals of the primary circuit between the coil and the distributor and connecting these extremities to Stop-a-Thief.

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This invention is a system aimed at preventing the theft of vehicles such as cars,trucks,heavy equipment,boats,motorcycles,and in general any vehicle equipped with a 12 volts (6 volts) ignition system. It could also be used to prevent the use of the vehicle by unauthorized personnel.

The prevention is achieved through an interception to the electrical system of the ignition anywhere along the line but preferably between the coil and the distributor. The small device controlling the interception is hidden anywhere in the vehicle.

The prevention system is automatically activated when the ignition switch is turned off. The owner must by-pass the interruption in the circuitry each time the vehicle is started by pressing down or closing a momentary switch that deactivates the interruption in the electrical current of the ignition circuit.

Canadian patent # 1080330 specifies an Auto-theft prevention system that also intercepts the electrical system of the ignition circuit between the two terminals of the primary circuit between the coil and the distributor. However,although once activated the patented device does provide auto-theft prevention, the protection is based on the owner of the vehicle activating the device by flipping a switch each time he leaves the vehicle unattended. In addition,the time delayed circuit breaker,that allows the vehicle to run for 5-10 seconds, must be reset each time use has been made of the vehicle without first deactivating the device.

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Stop-a-Thief, the name given to this invention,eliminates the dependence of the theft prevention on both the activation of the system by the owner of the vehicle and the reset of the time delayed circuit breaker. The "passive" character of StOp-a-Thief is achieved by using a double pole-single throw relay in which one pole,normally open,is used to self sustain the current to the relay coil only after a momentary switch has been pressed down and released while the other pole,also normally open, connects the wires from the terminals of the primary circuit between the coil and the distributor (or the module and the distributor in electronic ignition systems). To eliminate the need to reset the time delayed circuit breaker,an overload relay with automatic reset and sensitive to current is placed in parallel to the pole that connects the two terminals of the primary circuit between the coil and the distributor.

In other words,the moment the vehicle owner turns off the ignition switch,his vehicle is protected. A thief or unauthorized person can start the car through the use of a master key or hot-wired connection. The engine will run for 6-30 seconds (depending on the current generated in this ignition system) and will stall. The starter will turn the engine but the car will not "fire" or run. However,50-55 seconds later,the overload relay will automatically reset and allow the engine,if started,to run for a few additional seconds. This situation is both time consuming

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and confusing. The thief must flee ! .

Tools are required for rearrangement of connections and a circuit diagram is necessary for identification of wires.

The owner of the vehicle must press down and release a momentary switch,while ignition switch is on, to by-pass the protective system and resume normal operation of the vehicle. The device is small and can easily be hidden in a variety of spots in the vehicle at the owner's convenience.

In drawings which illustrate embodiment of the invention

Fig.1 is a typical conventional ignition system.

Fig.2 is a typical conventional ignition system with Stop-a-Thief anti-theft system.

Fig.3 is a typical conventional ignition system with Stop-a-Thief by-passed by the owner for normal operation of the car.

The (+) and (-) signs in these drawings refer to the positive and negative terminals of the ignition coil.

In a conventional 12 volts ignition system,when the ignition switch is turned on, current flows (2-3 Amps) in the wire connecting the terminals of the primary circuit between the coil and the distributor. This flow induces a high voltage on the secondary lead that connects the center of the coil to the center of the distributor. This high voltage is applied to the spark plugs in the appropriate cylinders according to a defined sequence related to the compression of the gas-air mixture in these cylinders. When the current in the

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primary circuitry is discontinued or "cut", the high voltage to the spark plugs is also discontinued and therefore no explosion takes place in these cylinders when the starter motor is activated and turns the engine. The engine will not "fire" . Fig.1 shows a typical conventional ignition system just described.

To install Stop-a-Thief, we refer to Fig.2 . The primary wire connecting the (-) terminal of the coil to the distributor is cut and connected to a pair of extension wires that run through the firewall and into the cabin of the vehicle. in Fig.2 this cut is represented by points A and B . The extension wires are connected to the terminals of an overload relay with automatic reset represented by points C and D . This overload relay (E.T.A. series 46-500-P) will open its contacts 30-35 seconds after a current of 1.6 Amps. will flow through and will reduce this time to 6 seconds when exposed to currents of 5 Amps. The contact will reset (close) after a period of 50-55 seconds. A double pole-single throw relay (guardian series 1390) has pole H connected in parallel to overload relay CD. Pole G connects the terminals of a momentary switch,normally open, EF. The momentary switch is connected in series between a 12 volts source (such as the (+) terminal of the ignition coil) and the coil terminal on the relay. The other terminal of the relay coil is connected to the vehicle ground.

When the ignition switch is turned on, the current on the

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primary lead that connects the (-) terminal of the ignition coil to the distributor reaches the distributor through the overload relay CD. When the overload relay CD opens its contacts,points A and B represent a discontinuity in the primary circuit of the ignitiona system. Points C and D are disconnected for 55 seconds (the reset time of the overload relay) and pole H of the D.P.S.T. relay is normally open. The engine stalls and cannot be restarted. 55 seconds later, the overload relay CD closes its contacts and the car can be restarted for a few seconds only.

To explain the operation and the by-passing of Stop-a-Thief we refer to Fig.3.

The Double Pole-Single Throw (D.P.S.T) relay has both poles G and H normally open (contacts discontinued). The momentary switch EF is also normally open and consequently causes the disconnection in the loop of the relay coil. When ignition switch is turned on and the momentary switch EF is pressed down,the relay coil is closed and both poles G and H are maintained closed. But now pole G,being closed,sustains the connection between points E and F even when momentary switch EF is released. The relay coil loop is sustained and pole H is maintained closed. Pole H,having a lower electrical resistance than overload relay CD,allows the electrical connection between points A and B on the primary circuit between the coil and the distributor to be maintained, The vehicle resumes normal operation. When the ignition switch is turned off,

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the current that flows through the relay coil is interrupted. Poles G and H return to the normally open position. The only connection between points A and B,on the primary circuit between the ignition coil and the distributor is now only possible through the overload relay CD. This means that if the vehicle is now started it will only run for a few seconds until the overload relay opens its contacts. To resume normal operation the momentary switch will have to be pressed down and released. This situation repeats each time the ignition switch is turned off.

Although Stop-a-Thief has been described for interception of the primary ignition circuit between the coil and the distributor,other ways exist for its use:

a. Stop-a-Thief could as well intercept the primary ignition system anywhere along the wire leading to the (+) terminal of the coil. The anti-theft protection will remain the same as described in the specifications.

b. When the vehicle is equipped with an electrical fuel pump, as in the case of many diesel engines, Stop-a-Thief could as well intercept any one of the two wires supplying electrical current to the fuel pump. In this case,points A and B (Fig.2) would represent the "cut" on one of the wires leading to the fuel pump. Pole H of the D.P.S.T. relay will connect to the terminal of the overload relay and from there to points A and B.

The final effect will be the stalling of the engine when the

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overload relay opens its contacts.The starter will still turn the engine but now the engine will not start because of the interruption in the supply of the fuel.

c. An additional on-off switch could be hidden in the vehicle and connect,through wires,to points A and B of Fig.2 and Fig.3 .

The Off position of this switch will not interfere with the regular theft prevention operation of Stop-a-Thief.

The On position of this switch will directly connect point A to B thus by-passing the theft prevention system in case of malfunction of the theft prevention device.

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THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A passive theft prevention device for vehicles having an ignition switch,ignition coil,and a distributor comprising of a normally open double pole-single throw electromechanical relay with a relay coil in which one pole is utilized to sustain the relay coil loop across a normally open momentary switch connected in series with the relay coil,while the other pole is connected across a "cut" on the primary circuit of a 12-volts ignition system, and an overload relay with an automatic reset connected in parallel to the other pole of the relay that connects across the "cut" on the primary circuit of the ignition system so that the overload relay must be by-passed each time the vehicle is to resume normal operation by pressing down or closing the momentary switch.

2. A passive theft prevention device for vehicles as defined in claim 1 with the other pole of the relay connecting across the "cut" on either one of the leads of the electrical fuel pump.

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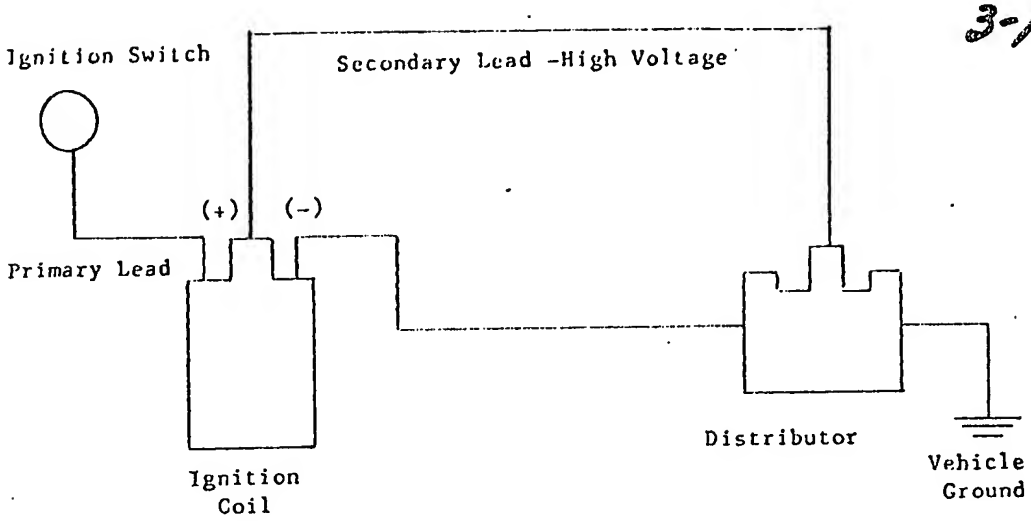

Fig.1

Typical Conventional Ignition System

A. Lin

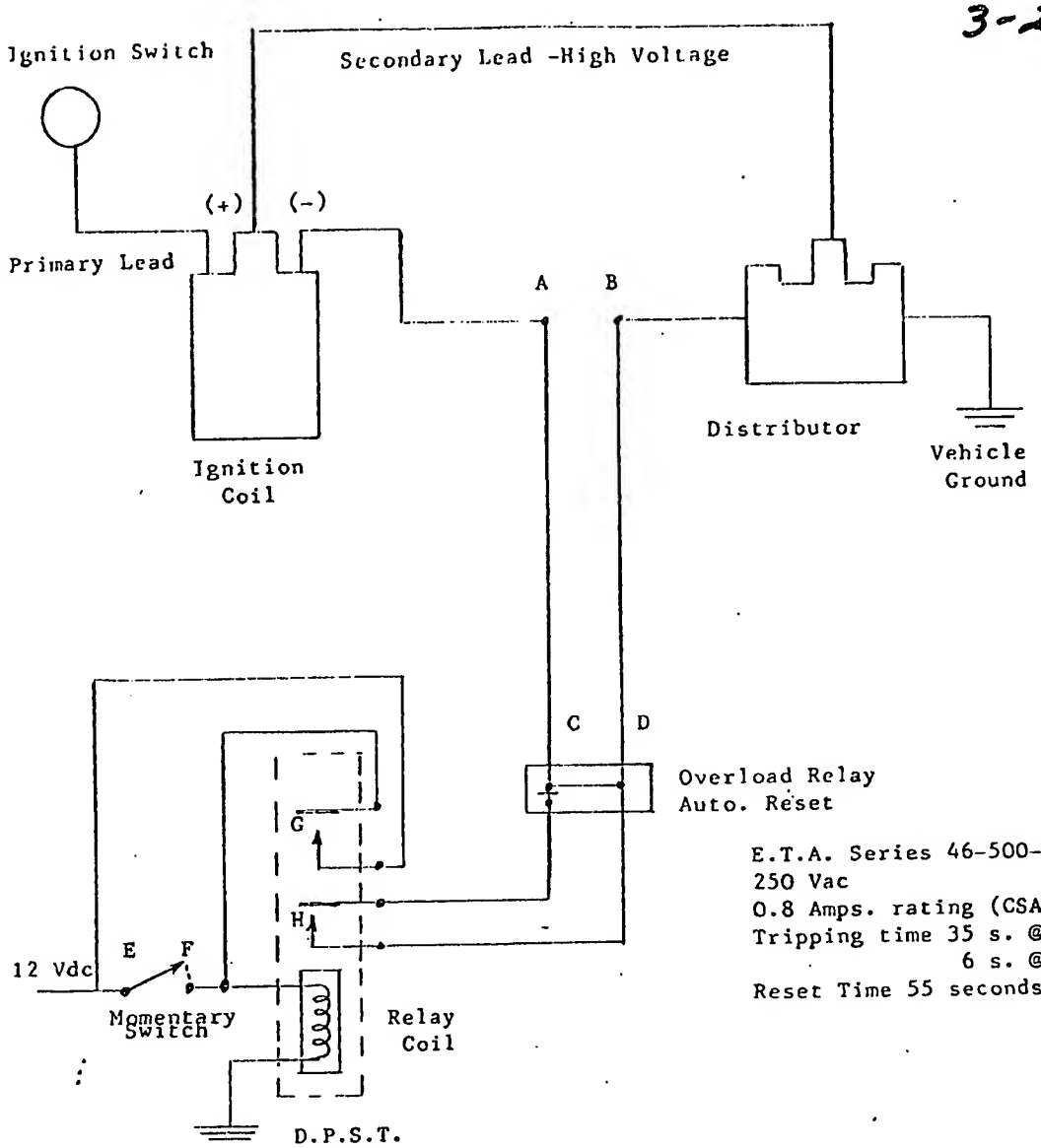

Fig.2

Typical Conventional Ignition System with Stop-a-Thief anti-theft device on.

A. Lim

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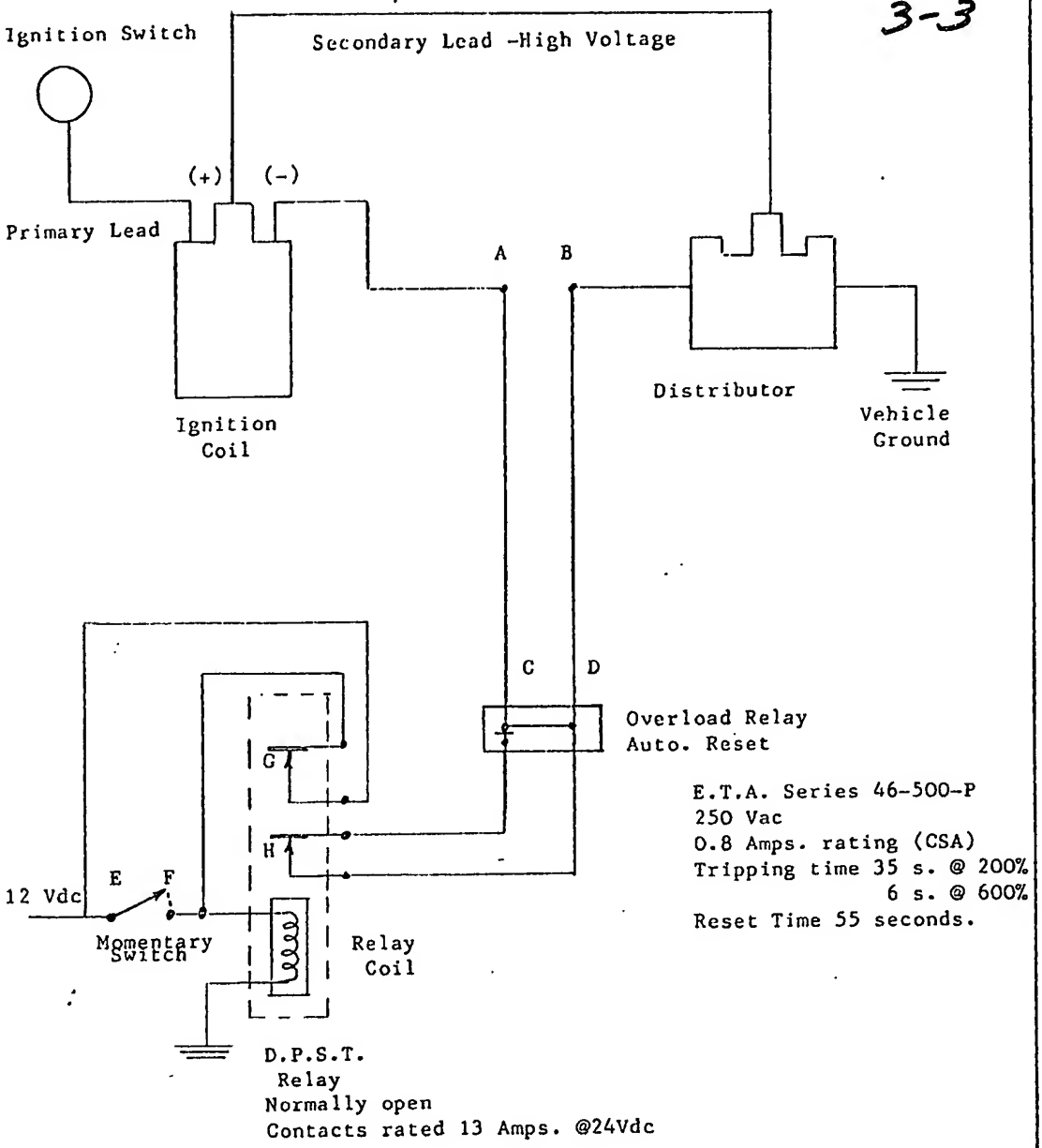

Fig.3

Typical Conventional Ignition System with Stop-a-Thief anti-theft device by-passed

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